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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/675,697
Filing Date: September 30, 2003
Appellant(s): BAER ET AL.

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John Oskorep
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 17 March 2008 appealing from the Office action mailed 5 April 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is substantially correct. The changes are as follows:

Grounds of Rejection to be Reviewed on Appeal

Claims 1, 2, 4, 6, 8-16, 23-26, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,315,875 to Sasaki in view of U.S. Patent Application Publication 2004/0027730 to Lille.

Grounds of Rejection not Withdrawn but not on Review

Claims 21 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki in view of Lille as applied to Claims 18 and 26, and further in view of U.S. Patent Application Publication 2002/0030443 to Konuma et al.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki in view of Lille as applied to Claim 12 above, and further in view of Applicant's Admitted Prior Art (AAPA).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,315,875	Sasaki	11-2001
2004/0027730	Lille	02-2004
2002/0030443	Konuma et al.	03-2002

Applicant's Admitted Prior Art, as disclosed in the Description of the Related Art in the instant Specification.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 2, 4, 6, 8-16, 18, 23-26, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,315,875 to Sasaki in view of U.S. Patent Application Publication 2004/0027730 to Lille.

In regards to Claim 1, Sasaki teaches a method of forming a read sensor for a magnetic head, comprising, prior to forming a track width for a read sensor: forming a first protective layer 5g over a plurality of read sensor layers (Figure 13; Column 11,

Line 58); forming a first photoresist layer 21 in a central region over the plurality of read sensor layers (Figures 13-14; Column 12, Lines 1-5); performing a reactive ion etching (RIE) to remove end portions of the protective layer 5g in end regions that surround the central region, thereby leaving intact a central protective portion of the protective layer underneath the first photoresist structure; performing an ion milling of the read sensor layers such that end portions of the read sensor layers are removed in the end regions and a central sensor portion remains underneath the first photoresist structure, to thereby define a stripe height for the read sensor (Figures 15 and 16; Column 12, Lines 11-62); forming an insulating layer 4b around the read sensor (Column 12, Line 63 - Column 13, Line 2); and removing the photoresist layer. (Column 13, Line 2) Sasaki teaches that the method further comprises, after defining the stripe height: forming a second photoresist layer 23 in a central region over the read sensor layers (Column 13, Lines 27-29), and etching the exposed portions of the read sensor layers to define a track width W for the read sensor. (Figure 19; Column 13, Lines 32-34)

In regards to Claim 1, Sasaki does not expressly teach that the RIE is performed without removing *any* of the read sensor layers.

Lille teaches that an RIE is performed to remove a protective layer 908 without removing any of the underlying read sensor layers. The read sensor layers are later removed by ion milling. (Figures 13 and 15; Paragraphs 46 and 48)

It would have been obvious to one of ordinary skill in the art to modify the method taught by Sasaki for the RIE to be performed so as to remove the end portions of the protective layer without removing any of the underlying read sensor layers. The

motivation for doing so would have been to better accomplish the goal disclosed by Sasaki of exploiting the differences between the RIE and the ion milling to ensure that the layers underneath the read sensor layers are not damaged when the read sensor layers are removed. Sasaki teaches that performing only ion milling would damage the underlying shield gap layer 4a, whereas removing the layers making up the GMR element by a two step etching process keeps the shield gap layer from being damaged. (Column 12, Lines 11-62) Even removing just the protective layer from the top surface of the GMR element would be an obvious variant of the teachings of Sasaki.

In regards to Claims 1 and 6, Sasaki does not expressly teach that the first photoresist can be removed by mechanical compression with a chemical-mechanical polishing (CMP) pad until it reaches a top surface of the protective layer.

Lille teaches that a photoresist used in a method of forming a read sensor can be sheared off by CMP, stopping at a protective layer 908. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to use the CMP method taught by Lille in the practice of Sasaki. The motivation for doing so, as taught by Lille (Paragraph 53), is that CMP can successfully remove the resist even when other materials have been deposited on it, without damaging the read sensor layers.

In regards to Claim 1, Sasaki does not expressly teach that the protective layer is a CMP protective layer that provides a suitable physical barrier to protect the read sensor layers from the CMP pad.

Lille teaches that first protective layer 908 can be made of a CMP protective material. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to modify the protective layer taught by Sasaki to form it of a CMP protective material, as taught by Lille. The motivation for doing so, as taught by Lille (Paragraph 53), would have been to help prevent mechanical dishing into the read sensor when the resist is removed by CMP.

In regards to Claim 2, Sasaki does not expressly teach that the photoresist 21 can be formed without an undercut.

Lille teaches that a photoresist 2002 used in a method of forming a read sensor can be formed without an undercut. (Figure 20; Paragraph 45)

It would have been obvious to form the photoresist taught by Sasaki without an undercut, as taught by Lille. The motivation for doing so would have been to form the photoresist in a single step, rather than depositing it in two layers, as Lille discloses is also known in the prior art (Paragraph 45).

In regards to Claim 4, Sasaki also teaches forming hard bias layer 61 and lead layer 6 around the read sensor (Figure 19; Column 13, Lines 38-61), and removing the second photoresist 23 (Column 13, Lines 57-58).

Sasaki does not expressly teach that the second photoresist can be removed by CMP.

Lille teaches that a photoresist used in a method of forming a read sensor can be sheared off by CMP. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to use the CMP method taught by Lille to remove the second photoresist taught by Sasaki. The

motivation for doing so, as taught by Lille (Paragraph 53), is that CMP can successfully remove the resist even when other materials have been deposited on it.

In regards to Claim 8, the combination of Sasaki and Lille discussed above does not expressly teach that a second CMP protective layer of insulator material is formed prior to removing the first photoresist structure.

However, Lille additionally teaches that a second CMP protective layer 2302 of insulator material should be formed over materials that surround the read sensor layers before removing a photoresist structure. (Figure 23; Paragraph 53)

It would have been obvious to one of ordinary skill in the art to further modify the combination of Sasaki and Lille to form a second CMP protective layer of insulator material before removing a photoresist structure. The motivation for doing so, as taught by Lille (Paragraph 53), would have been to protect the surrounding materials from the CMP removal of the photoresist.

In regards to Claims 9 and 10, the combination of Sasaki and Lille as applied to Claim 8 does not expressly teach that the second protective layer has a thickness of 100-200 Angstroms, or that both the first and second protective layers can comprise carbon.

Lille teaches that first protective layer 908 and second protective layer 2302 can each be formed of diamond-like carbon (DLC) with a thickness of 40-200 Angstroms. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to make each protective layer of diamond-like carbon (DLC) with a thickness of 40-200 Angstroms, as

taught by Lille. The motivation for doing so would have been to use protective layers that are suitably CMP-resistant. (Paragraph 53) The examiner notes that it has been held that the selection of a known material based on its suitability for its intended use is *prima facie* obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

In regards to Claim 11, Sasaki does not expressly teach removing the central protective portion by RIE prior to forming the second photoresist structure.

Lille teaches that the central portion of a protective layer 908 formed over the read sensor layers can be removed by RIE. (Paragraphs 53, 54)

It would have been obvious to one of ordinary skill in the art to modify the method taught by Sasaki to remove the first protective layer by RIE before forming the second photoresist. The motivation for doing so, as taught by Lille (Paragraph 54), would have been to expose the underlying read sensor layers to an oxygen plasma in order to increase the sensitivity of the read sensor. The motivation for performing this step prior to forming the second photoresist, rather than after it had already been formed and then removed, would have been to avoid exposing the intermediately-formed lead layers to the same plasma.

In regards to Claim 12, Sasaki teaches a method of forming a stripe height for a read sensor for a magnetic head, comprising: forming a first protective layer 5g over a plurality of read sensor layers (Figure 13; Column 11, Line 58); forming a first photoresist layer 21 in a central region over the plurality of read sensor layers (Figures 13-14; Column 12, Lines 1-5); performing a reactive ion etching (RIE) to remove end

portions of the protective layer 5g in end regions that surround the central region, thereby leaving intact a central protective portion of the protective layer underneath the first photoresist structure; performing an ion milling of the read sensor layers such that end portions of the read sensor layers are removed in the end regions and a central sensor portion remains underneath the first photoresist structure, to thereby define a stripe height for the read sensor (Figures 15 and 16; Column 12, Lines 11-62); and removing the photoresist layer. (Column 13, Line 2) Sasaki teaches that the method further comprises, after defining the stripe height: forming a second photoresist layer 23 in a central region over the read sensor layers (Column 13, Lines 27-29), and etching the exposed portions of the read sensor layers to define a track width W for the read sensor. (Figure 19; Column 13, Lines 32-34)

In regards to Claim 12, Sasaki does not expressly teach that the RIE is performed without removing *any* of the read sensor layers.

Lille teaches that an RIE is performed to remove a protective layer 908 without removing any of the underlying read sensor layers. The read sensor layers are later removed by ion milling. (Figures 13 and 15; Paragraphs 46 and 48)

It would have been obvious to one of ordinary skill in the art to modify the method taught by Sasaki for the RIE to be performed so as to remove the end portions of the protective layer without removing any of the underlying read sensor layers. The motivation for doing so would have been to better accomplish the goal disclosed by Sasaki of exploiting the differences between the RIE and the ion milling to ensure that the layers underneath the read sensor layers are not damaged when the read sensor

layers are removed. Sasaki teaches that performing only ion milling would damage the underlying shield gap layer 4a, whereas removing the layers making up the GMR element by a two step etching process keeps the shield gap layer from being damaged. (Column 12, Lines 11-62) Even removing just the protective layer from the top surface of the GMR element would be an obvious variant of the teachings of Sasaki.

In regards to Claims 12 and 16, the combination of Sasaki and Lillle just discussed does not expressly teach that the first and second photoresists can be removed by mechanical compression with a chemical-mechanical polishing (CMP) pad.

Lille teaches that a photoresist used in a method of forming a read sensor can be sheared off by CMP. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to use the CMP method taught by Lille to remove the photoresists taught by Sasaki. The motivation for doing so, as taught by Lille (Paragraph 53), is that CMP can successfully remove the resist even when other materials have been deposited on it.

In regards to Claim 12, Sasaki does not expressly teach that the first protective layer is a CMP protective layer that provides a suitable physical barrier to protect the read sensor layers from the CMP pad.

Lille teaches that first protective layer 908 can be made of a CMP protective material. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to modify the protective layer taught by Sasaki to form it of a CMP protective material, as taught by Lille. The motivation for doing so, as taught by Lille (Paragraph 53), would have been to

help prevent mechanical dishing into the read sensor when the resist is removed by CMP.

In regards to Claim 12, Sasaki does not expressly teach that a second CMP protective layer is formed around the central protective portion prior to removing the first photoresist structure.

Lille teaches that a second CMP protective layer 2302 of insulator material should be formed over materials that surround the read sensor layers before removing a photoresist structure. (Figure 23; Paragraph 53)

It would have been obvious to one of ordinary skill in the art to further modify the method taught by Sasaki to form a second protective layer before removing a photoresist structure. The motivation for doing so, as taught by Lille (Paragraph 53), would have been to protect the surrounding materials from the CMP removal of the photoresist.

In regards to Claim 13, Sasaki teaches that after the read sensors are etched using the photoresist as a mask, and prior to removing the photoresist, an insulating layer 4b is formed around the read sensor. (Column 12, Line 63 - Column 13, Line 2) The second protective layer taught by the combination of Sasaki and Lille would protect this insulating layer when the first photoresist is removed by CMP.

In regards to Claim 14, Sasaki also teaches forming hard bias layer 61 and lead layer 6 around the read sensor (Figure 19; Column 13, Lines 38-61). The second protective layer taught by the combination of Sasaki and Lille would protect these layers when the first photoresist is removed by CMP.

In regards to Claim 15, Sasaki does not expressly teach that the photoresists 21, 23 can be formed without an undercut.

Lille teaches that a photoresist 2002 used in a method of forming a read sensor can be formed without an undercut. (Figure 20; Paragraph 45)

It would have been obvious to form both of the photoresists taught by Sasaki without an undercut, as taught by Lille. The motivation for doing so would have been to form the photoresists each in a single step, rather than depositing them in two layers, as Lille discloses is also known in the prior art (Paragraph 45).

In regards to Claim 18, the combination of Sasaki and Lille as applied to Claim 12 does not expressly teach that both CMP protective layers can comprise carbon.

Lille teaches that first protective layer 908 and second protective layer 2302 can each be formed of diamond-like carbon (DLC). (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to make each protective layer of diamond-like carbon (DLC), as taught by Lille. The motivation for doing so would have been to use protective layers that are suitably CMP-resistant. (Paragraph 53) The examiner notes that it has been held that the selection of a known material based on its suitability for its intended use is *prima facie* obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

In regards to Claim 23, Sasaki teaches a method of forming a stripe height for a read sensor for a magnetic head, comprising: forming a first protective layer 5g over a plurality of read sensor layers (Figure 13; Column 11, Line 58); forming a first photoresist layer 21 in a central region over the plurality of read sensor layers (Figures

13-14; Column 12, Lines 1-5); performing a reactive ion etching (RIE) to remove end portions of the protective layer 5g in end regions that surround the central region, thereby leaving intact a central protective portion of the protective layer underneath the first photoresist structure; performing an ion milling of the read sensor layers such that end portions of the read sensor layers are removed in the end regions and a central sensor portion remains underneath the first photoresist structure, to thereby define a stripe height for the read sensor (Figures 15 and 16; Column 12, Lines 11-62); forming an insulating layer 4b around the read sensor (Column 12, Line 63 - Column 13, Line 2); and removing the photoresist layer. (Column 13, Line 2)

In regards to Claim 23, Sasaki does not expressly teach that the RIE is performed without removing *any* of the read sensor layers.

Lille teaches that an RIE is performed to remove a protective layer 908 without removing any of the underlying read sensor layers. The read sensor layers are later removed by ion milling. (Figures 13 and 15; Paragraphs 46 and 48)

It would have been obvious to one of ordinary skill in the art to modify the method taught by Sasaki for the RIE to be performed so as to remove the end portions of the protective layer without removing any of the underlying read sensor layers. The motivation for doing so would have been to better accomplish the goal disclosed by Sasaki of exploiting the differences between the RIE and the ion milling to ensure that the layers underneath the read sensor layers are not damaged when the read sensor layers are removed. Sasaki teaches that performing only ion milling would damage the underlying shield gap layer 4a, whereas removing the layers making up the GMR

element by a two step etching process keeps the shield gap layer from being damaged. (Column 12, Lines 11-62) Even removing just the protective layer from the top surface of the GMR element would be an obvious variant of the teachings of Sasaki.

In regards to Claim 23, Sasaki does not expressly teach that the photoresist 21 can be formed without an undercut.

Lille teaches that a photoresist 2002 used in a method of forming a read sensor can be formed without an undercut. (Figure 20; Paragraph 45)

It would have been obvious to form the photoresist taught by Sasaki without an undercut, as taught by Lille. The motivation for doing so would have been to form the photoresist in a single step, rather than depositing it in two layers, as Lille discloses is also known in the prior art (Paragraph 45).

In regards to Claim 23, the combination of Sasaki and Lillle just discussed does not expressly teach that the first photoresist can be removed by mechanical compression with a chemical-mechanical polishing (CMP) pad.

Lille teaches that a photoresist used in a method of forming a read sensor can be sheared off by CMP. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to use the CMP method taught by Lille to remove the photoresist taught by Sasaki. The motivation for doing so, as taught by Lille (Paragraph 53), is that CMP can successfully remove the resist even when other materials have been deposited on it.

In regards to Claim 23, Sasaki does not expressly teach that the first protective layer is a CMP protective layer that provides a suitable physical barrier to protect the read sensor layers from the CMP pad.

Lille teaches that first protective layer 908 can be made of a CMP protective material. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to modify the protective layer taught by Sasaki to form it of a CMP protective material, as taught by Lille. The motivation for doing so, as taught by Lille (Paragraph 53), would have been to help prevent mechanical dishing into the read sensor when the resist is removed by CMP.

In regards to Claim 23, Sasaki does not expressly teach that a second CMP protective layer is formed around the central protective portion prior to removing the first photoresist structure.

Lille teaches that a second CMP protective layer 2302 of insulator material should be formed over materials that surround the read sensor layers before removing a photoresist structure. (Figure 23; Paragraph 53)

It would have been obvious to one of ordinary skill in the art to further modify the method taught by Sasaki to form a second protective layer before removing a photoresist structure. The motivation for doing so, as taught by Lille (Paragraph 53), would have been to protect the surrounding materials from the CMP removal of the photoresist.

The central protective portion and the second protective layer taught by the combination of Sasaki and Lille would protect the read sensor and the insulator layer from mechanical interaction with the CMP pad. (Lille, Paragraph 54)

In regards to Claim 24, Sasaki teaches that the method further comprises, after defining the stripe height: forming a second photoresist layer 23 in a central region over the read sensor layers (Column 13, Lines 27-29), and etching the exposed portions of the read sensor layers to define a track width W for the read sensor. (Figure 19; Column 13, Lines 32-34)

In regards to Claim 24, Sasaki does not expressly teach that the photoresist 23 can be formed without an undercut.

Lille teaches that a photoresist 2002 used in a method of forming a read sensor can be formed without an undercut. (Figure 20; Paragraph 45)

It would have been obvious to form the photoresist taught by Sasaki without an undercut, as taught by Lille. The motivation for doing so would have been to form the photoresist in a single step, rather than depositing it in two layers, as Lille discloses is also known in the prior art (Paragraph 45).

In regards to Claim 25, see the discussion of Claim 24.

The combination of Sasaki and Lillle as applied to Claim 24 does not expressly teach that the second photoresist can be removed by mechanical compression with a chemical-mechanical polishing (CMP) pad.

Lille teaches that a photoresist used in a method of forming a read sensor can be sheared off by CMP. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to use the CMP method taught by Lille to remove the photoresist taught by Sasaki. The motivation for doing so, as taught by Lille (Paragraph 53), is that CMP can successfully remove the resist even when other materials have been deposited on it.

In regards to Claims 26 and 28, the combination of Sasaki and Lille as applied to Claim 23 does not expressly teach that the protective layers each have a thickness of 100-200 Angstroms, or that both protective layers can comprise carbon.

Lille teaches that first protective layer 908 and second protective layer 2302 can each be formed of diamond-like carbon (DLC) with a thickness of 40-200 Angstroms. (Paragraph 53)

It would have been obvious to one of ordinary skill in the art to make each protective layer of diamond-like carbon (DLC) with a thickness of 40-200 Angstroms, as taught by Lille. The motivation for doing so would have been to use protective layers that are suitably CMP-resistant. (Paragraph 53) The examiner notes that it has been held that the selection of a known material based on its suitability for its intended use is *prima facie* obviousness. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945).

In regards to Claim 29, the combination of Sasaki and Lille as applied to Claim 23 teaches that the first protective layer is formed over the read sensor layers and that the second protective layer is formed over the read sensor layers and the surrounding materials, which, as taught by Sasaki, are insulator materials 4b.

In regards to Claim 30, the combination of Sasaki and Lille just discussed does not expressly teach that the central portions of the first and second protective layers can be removed by RIE.

Lille teaches that the protective layers can be removed by RIE. (Paragraph 54, "any CMP-resistant layer")

It would have been obvious to one of ordinary skill in the art to further modify the method taught by Sasaki to remove the central portions of the first and second protective layers by RIE. The motivation for removing the first protective layer, as taught by Lille (Paragraph 54), would have been to expose the underlying read sensor layers to an oxygen plasma in order to increase the sensitivity of the read sensor. The motivation for removing the second protective layer would have been to expose the surrounding materials to further processing.

Claims 21 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki in view of Lille as applied to Claims 18 and 26, and further in view of U.S. Patent Application Publication 2002/0030443 to Konuma et al.

The combination of Sasaki and Lille as discussed above in regards to Claims 18 and 26 teaches two CMP protective layers, both comprising diamond-like carbon.

The combination of Sasaki and Lille does not expressly teach that the hardness of the DLC protective layer can be 22 GPa.

Konuma et al. teaches that a DLC thin film can have a hardness of 15-25 GPa. (Paragraph 82)

It would have been obvious to one of ordinary skill in the art to make the DLC films taught by the combination of Sasaki and Lille with a hardness of 22 GPa, which is in the range taught by Konuma et al. The motivation for doing so, as taught by Konuma et al. (Paragraph 82), would have been to have protective layers that are not only hard, but do not transmit oxygen or moisture.

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki in view of Lille as applied to Claim 12 above, and further in view of Applicant's Admitted Prior Art (AAPA).

The teachings of Sasaki and Lille were discussed above in regards to Claim 12.

The combination of Sasaki and Lille as applied to Claim 12 does not expressly teach that both the first and second photoresists can be formed without an undercut.

Lille teaches that a photoresist 2002 used in a method of forming a read sensor can be formed without an undercut. (Figure 20; Paragraph 45)

It would have been obvious to form both of the photoresists taught by Sasaki without an undercut, as taught by Lille. The motivation for doing so would have been to form the photoresists each in a single step, rather than depositing them in two layers, as Lille discloses is also known in the prior art (Paragraph 45).

The combination of Sasaki and Lille just discussed does not expressly teach that the second photoresist structure is exposed to a solvent prior to removal.

AAPA teaches that a photoresist structure is preferably exposed to a solvent prior to removal. (Specification, Page 2, Lines 8-11)

It would have been obvious to one of ordinary skill in the art to further modify the combination of Sasaki and Lille to expose the photoresist structure to a solvent prior to removal. The motivation for doing so, as taught by AAPA (Specification, Page 2, Lines 8-11), would have been to help release the photoresist from the substrate.

(10) Response to Argument

In response to Applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Specifically, Applicant's argument that Sasaki alone does not teach or provide a motivation for forming the protection layer as a CMP protection layer is to attack only Sasaki where the rejection is based on the combination of Sasaki and Lille. Anything not foreseen by Sasaki is remedied by the teachings of Lille.

In response to Applicant's argument that one of ordinary skill in the art would not find it obvious to modify the top tantalum capping layer taught by Sasaki to form a layer of CMP protective material as taught by Lille, because to do so would destroy the necessary protection provided by the tantalum layer taught by Saskai, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

Examiner maintains that one of ordinary skill in the art, informed by Lille's *alternative* teaching, presumed to be operable, that a protective layer can be atlternatively made of a CMP protective material (and also already informed by Lille's alternative teaching that using CMP to remove a photoresist itself has additional benefits), would have found it obvious with a reasonable expectation of success to modify the top capping layer to form a layer of CMP protective material as taught by Lille, for the predictable result of preventing mechanical dishing into the read sensor when the resist is removed by CMP.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant asserts that the combination of Sasaki and Lille must fail, because the combination defeats and runs counter to the main objective of the primary reference, Sasaki. The Examiner must disagree. Sasaki does, as Applicant observes, teach a conventional method of removing read sensor layers 105a, 105b, 105c making up a GMR element in a single ion milling step. (Column 3, Lines 57-61) Sasaki seeks to *improve* upon this conventional method by forming a GMR element of a plurality of read sensor layers 5a, 5e, 5b, 5f, 5c *and a protection layer 5g* that Sasaki *calls part of the*

GMR element 5 (Figure 13; Column 11, Lines 50-62), and following the masking steps, *etching the GMR element in a two step process*, comprising a first step of RIE and a second step of ion milling. (Column 12, Lines 11-40) Sasaki teaches that in the first etching step of RIE, *some of the layers making up the GMR element 5* are etched. (Column 12, Lines 14-17) Again, the Examiner notes that Sasaki identifies the protection layer 5g, corresponding to the protective layer recited in the claims of the instant application, *as part of the GMR element. Therefore, when Sasaki says that some of the layers making up the GMR element 5 are etched, this includes the case that only the protection layer is etched.* However, the Examiner recognizes that Sasaki does not *expressly* disclose this embodiment of the first etching step of RIE. For this reason, the Examiner cited the teachings of Lille that an RIE is performed to remove a protective layer 908 without removing any of the underlying read sensor layers, with the read sensor layers being later removed by ion milling. (Figures 13 and 15; Paragraphs 46 and 48) Again, any lack of express teaching in Sasaki of any particular step of the claimed method is fully remedied by the teachings of Lille.

The Examiner maintains that it would have been obvious to one of ordinary skill in the art to modify the method expressly disclosed by Sasaki (that some of the layers making up GMR element 5 are etched by RIE) *to incorporate the teachings of Lille* (that the RIE only removes the protection layer, which Sasaki calls part of GMR element 5). The motivation for doing so would have been to better accomplish the goal disclosed by Sasaki of exploiting the differences between the RIE and the ion milling to ensure that the layers underneath the read sensor layers are not damaged when the read sensor

layers are removed. Sasaki teaches that performing only ion milling would damage the underlying shield gap layer 4a, whereas removing the layers making up the GMR element by a two step etching process keeps the shield gap layer from being damaged. (Column 12, Lines 11-62) Even removing just the protective layer from the top surface of the GMR element would be an obvious variant of the teachings of Sasaki, *particularly in view of the teachings of Lille.*

The Examiner asserts that making this modification of the teachings of Sasaki does not defeat the objective of Sasaki. This is clear for at least two reasons. First, Sasaki is seeking to improve upon a one-step etching method by performing instead a two-step etching method. Even if the first step of the etching method were only used to remove the protection layer (which Sasaki calls part of the GMR element 5), the second step of the etching method would take less time than otherwise, still allowing the goal of Sasaki to be attained. (Column 12, Lines 49-54) Second, even if, for the sake of argument, the modified method of the combination of Sasaki and Lille were deemed to be the same as performing the conventional method taught by Sasaki, the combination of Sasaki and Lille would still not be defeated. The conventional method taught by Sasaki is still a viable, workable process, which Sasaki simply seeks to improve upon. One of ordinary skill in the art would have every expectation of success in performing the conventional method. Sasaki does not teach *away* from the conventional method, but rather teaches a better way. The Examiner notes that these arguments do not constitute additional or alternative grounds of rejection; the Examiner is merely trying to address Applicant's argument in full. The Examiner is not mixing and matching the

teachings of Sasaki, but rather addressing Applicant's arguments regarding the disclosed teachings of Sasaki.

The Examiner further observes that even given the intention to perform a first etching step of RIE to remove only the protection layer, without removing any of the read sensor layers, some etching of the underlying read sensor layers would still occur before an endpoint detection means would be able to stop the RIE. This is especially true given that the protection layer and read sensor layers in question are extremely thin. (See, for example, Sasaki, Column 12, Lines 1-10) This discussion raises a question of interpretation of the word "intact" as recited in the claims of the instant application. The Examiner notes that "intact" was given the broadest reasonable interpretation during the examination on the merits, namely that the read sensor layers are substantially left intact, or alternatively are not intentionally etched.

Finally, Examiner wishes to emphasize that while Applicant's arguments are directed against the teachings of Sasaki, the rejection set forth above is based on the combination of the teachings of Sasaki *and* Lille. Examiner recognizes that Sasaki alone does not expressly teach every limitation of the claimed invention. However, anything not expressly foreseen by Sasaki is remedied by the teachings of Lille. One of ordinary skill in the art, taking the teachings of Sasaki *and* Lille as a whole, would have found it obvious to perform the claimed method with a reasonable expectation of success.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Maureen G. Arancibia/

Examiner, Art Unit 1792

Conferees:

/Parviz Hassanzadeh/
Supervisory Patent Examiner, Art Unit 1792

/Jennifer Michener/

QAS, TC1700